

REMARKS

Enclosed herewith is a copy of a petition (filed contemporaneously with this amendment) to extend the time for filing a response from 5/26/98 to 7/26/98.

As a result of this amendment, claims 1, 3-7, 9-16, 18, 24, and 29-33 are now in the application.

The claims have been rejected under 35 USC 112 as being indefinite, under 35 USC 102 as being anticipated by prior art, and under 35 USC 103 as being obvious from prior art.

Applicants recognize that the rejection of claim 25 under 35 USC 112, first paragraph as containing subject matter which was not described in the specification is moot since the claim has been canceled. Nevertheless, Applicants wish to assert for the record that they believe the rejection was not well founded since Applicants have indicated on page 11, first paragraph, that the "gooseneck conduit may take various forms known to persons skilled in the art". Therefore, Applicants are not limited by their specification to a malleable shaft construction that consists of two coils. In keeping with that position, Applicants have presented new claim 33, and also continue to assert claim 12 in support of their assertion that the hollow conduit that surrounds the electrical conductors and fiber optic lines does not necessarily have to comprise two metal coils.

The rejection of claims 8, 11, 12, 17 and 23 under 35 USC 112, second paragraph, as being indefinite, has been carefully considered. As a consequence, Applicants have amended claims 11 and 12, while deleting claims 8, 17 and 23.

Claim 11 has been amended to avoid the possible interpretation that optical fibers are additional elements and claim 12 has been amended to add the function of the camera control means. Also, claims 11 and 12 have been amended to specify that the camera housing has a two-tube construction with the optic means

comprising optical fibers that extend between the two tubes. Therefore, the rejection of claims 11 and 12 as indefinite is no longer believed to be correct and withdrawal of that ground of rejection is respectfully solicited.

Claims 1, 2, 8, 12, 13, 20, 21, 24 and 26-28 have been rejected under 35 USC 102(b) as being anticipated by Cooper et al 4,727,416. Claims 2, 8, 20, 21 and 26-28 have been canceled. Therefore, only claims 1, 12, 13, and 24 stand rejected under 35 USC 102(b) on the basis of Cooper et al.

Applicants respectfully request reconsideration of that Section 102(b) rejection because they believe that the Cooper et al reference does not teach or render obvious the invention defined by claims 1, 12, 13 and 24, and the claims that depend therefrom, as herein amended.

The Cooper et al patent pertains to a video dental camera which comprises a camera head 14 mounted on a shaft extension 13 of a handle 11. The extension 13 is indicated as being malleable or else the dental camera includes suitable joints and/or pivots so that its shape can be changed for selected purposes (column 2, lines 63-67).

Claim 1 has been amended so as to require that the video camera have a housing, and further that the endoscope have a flexible cable connected to the video camera, with the cable including fiber optic means for transmitting light to the distal end of the camera and optical conductors connected to the electronic imaging means for carrying electrical signals from the camera to apparatus for processing those signals, plus a malleable shaft having a groove in its outer surface, with the cable being disposed in the groove in secure relation with the shaft.

Applicants respectfully submit that claim 1 defines a combination of components that is patentable over Cooper et al. The concept of having a camera with an electro-optical cable connected to the camera that contains electrical conductors and optical fibers, plus a malleable shaft having a groove in its outer

surface, with the cable being disposed in the groove in secured relation with the shaft, is neither disclosed nor suggested by Cooper et al. Instead, that combination of features is a novel invention for which Applicants deserve patent protection.

Claims 3-7 and 11 all depend from claim 1 and are believed to be patentable over Cooper et al for the same reasons advanced above. Additionally they add other limitations which are neither disclosed nor rendered obvious by Cooper et al. In particular, the Examiner's attention is drawn to claim 7 which calls for a spring clip that is mounted on the distal end of the shaft and frictionally embraces the camera housing so as to releasably attach the shaft to the camera housing.

Claim 12 differs from claim 1 in that it is directed to the concept of having the electro-optical cable encased in a malleable hollow shaft. It also specifies that the camera have (1) a free-standing housing with a tubular extension having a first tubular member surrounding a second tubular member, with image-acquiring optical means and electronic imaging means mounted within the second tubular member, (2) a malleable hollow shaft with its distal end secured to the camera housing, and (3) an electro-optical cable having electrical conductors connected to the imaging means and fiber optic lines extending between the two tubular members. That claimed construction is neither disclosed nor rendered obvious from Cooper et al.

Claim 13 was also rejected as being anticipated by Cooper et al 4,727,416. Like claim 1, claim 13 has been amended to call for a longitudinally-extending groove in the malleable shaft, with the flexible cable positioned within the groove and being releasably secured to the shaft as a result of a friction fit in the groove. Additionally, claim 13 distinguishes from claim 1 in that it calls for connector means attached to the proximal end of the cable for connecting the conductors to an external circuit for processing the signals from the electronic imaging means and the fiber optic lines to a light source, with said connector means being

independent of the malleable shaft. That combination of features clearly is neither disclosed nor rendered obvious by Cooper et al.

Claims 14 and 15 depend from claim 13 and are believed to be patentable over Cooper et al for the same reasons as claim 13, and also because they add other features which are neither disclosed nor suggested by Cooper et al.

Claim 24 is similar to claim 12 except that it requires the hollow shaft to comprise a pair of concentric flexible and resilient coils. Cooper et al does not teach or suggest use of such a shaft. Therefore, claim 24 is allowable over Cooper et al.

Claims 5 and 15 stand rejected under 35 USC 103(a) as being unpatentable over Cooper et al in view of Reid, Jr. 4,800,870. The latter patent discloses a method of examining the bile duct of a patient utilizing an endoscope in combination with a probe. The probe is a flexible hollow member 6 which accommodates a stylet (7 or 8). The stylet is a fine malleable wire and it is inserted in an opening in the probe 6. Reid, Jr. does not disclose a malleable shaft for supporting an electro-optical cable comprising an elastomeric rod having a malleable metal wire embedded in and extending lengthwise of the rod, as required by claims 5 and 15. In contrast to Applicants' construction, the stylet 7 is movable within the probe 6, so that the combination of probe 6 and stylet 7 does not correspond in construction or function to Applicants' malleable shaft. Therefore, claims 5 and 15 are believed to be allowable over Cooper et al even when considered together with Reid.

Claim 18 stands rejected as unpatentable over Cooper et al in view of Reid, further as applied to claim 15. Applicants submit that claim 18 is patentable for the same reasons as claims 5 and 15.

Applicants respectfully request reconsideration of the rejection of claims 1, 3-7, 11-16, and 24 which have been rejected under 35 USC 103(a) as being unpatentable over Takahashi 4,616,631 in view of Adair 5,489,256, further in view

of Reid, Jr. Applicants concede that Takahashi shows a flexible pipe assembly that comprises a body of flexible material 1 having exterior grooves 3. Applicants further concede that grooves 3 are designed to releasably accommodate tubes 5 and 6.

Applicants further concede that Adair pertains to endoscopes and that Adair shows video camera components in the form of a CCD 14, electrical conductor 16 and optical fibers 20. However, Takahashi and Adair do not disclose or suggest a malleable shaft which supports an electro-optical cable that is attached to a video camera, as required by Applicants' claims 1, 3-7, 11-16 and 24.

It is recognized that the apparatus defined by claim 24 is similar to what is shown by Takahashi in that it requires the hollow shaft attached to the housing to surround conductors and optical fibers that are connected to the camera. However, there is no teaching in Takahashi or Adair of using a malleable shaft. In this connection it is not sufficient that the references show a flexible shaft, since Applicants' claims require that the malleable shaft be adapted to be bent manually to a selected shape and to hold that shape until it is bent manually to another selected shape.

The deficiency of both Takahashi and Adair to disclose a malleable shaft is not made up by Reid, Jr., since Reid, Jr. does not disclose a malleable shaft for supporting an endoscope camera, as required by Applicants' claims. Therefore, Applicants' claims are believed to be patentable over Takahashi, Adair and Reid.

The rejection of claims 9 and 10 as unpatentable over Cooper et al in view of Clark et al 5,607,094 is respectfully traversed and reconsideration is requested. It is conceded that Clark et al discloses a gooseneck conduit which comprises a dual helical structure. However, Clark et al does not show use of such a structure as a support for a camera, as required by claims 9 and 10. Nor can it be said that the use of a gooseneck conduit for supporting a camera in an endoscope is obvious

from Clark et al or from Cooper et al, since there is no teaching in either reference of the advantage of providing such a structure for supporting a video camera.

The other references have been considered, but they do not appear to present any teachings that affect the patentability of Applicants' invention. The Opie et al patent admittedly relates to an endoscope having a flexible shaft, but it does not disclose an endoscope having a malleable shaft. The reference does show an insertion portion having a channel 76 for receiving a flexible disposable tubing 72. However, the tubing 72 is not a cable as called for by Applicants' claims. Moreover, the member having the groove 76 is not a malleable member as required by Applicants' claims. The Greene patent pertains to an intubating stylet that has a semi-malleable region that allows it to be bent to a desired shape and to retain its shape during intubation. However, Greene provides no teachings that are obviously intended for improving on endoscopes.

The Fritch et al patent pertains to an ocular endoscope. The reference is of interest in that it teaches in column 7 that the flexible scope 34 may be semi-rigid and malleable, and that the malleable characteristic can be achieved by placing silver strands within a plastic sheath 60. However, although Fritch et al features a malleable member having a malleable wire encased in a plastic sheathing, it does not teach or suggest providing a malleable shaft for supporting a camera cable, as required by Applicants' claims.

In view of the foregoing remarks, Applicants' respectfully submit that claims 1, 3-7, 9-16, 18 and 24 are patentable over the prior art cited by the Examiner.

New claims 29-33 are also believed to be allowable. Claim 29 depends from claim 1 and requires that the camera be a stereo camera.

Claim 30 is believed to be patentable for the same reasons as claim 1 and also because it specifically calls for connector means attached to the proximal end of the cable that is independent of the shaft. In Cooper et al for example, no such connector means is disclosed or suggested. Claim 30 also distinguishes from

Cooper et al and the other references of record by requiring that the malleable shaft have a longitudinally extending groove with the electro-optical cable being disposed in the groove in secured relation with the shaft.

Claims 32 and 33 define microsize camera apparatus. Claim 32 is like claim 1 in that it requires a malleable shaft having a groove in its outer surface with a flexible cable comprising both electrical and optical conductors releasably secured in the groove of the shaft, plus connector means attached to the proximal end of the cable independently of said shaft for connecting the connectors to apparatus for processing the electrical signals from the electronic imaging means and for connecting the fiber optic means to a light source. Claim 33 differs from claim 32 in that it calls for a malleable shaft surrounding a flexible cable which is made up of electrical conductors and fiber optic lines. These claims are believed to be allowable over the prior art of record for the reasons advanced above.

In view of the foregoing remarks, it is respectfully believed that this amendment places the application in condition for allowance. Therefore, prompt and favorable reconsideration is solicited.

Respectfully submitted,

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